REMARKS

Claims 1-24, as amended, remain herein.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment.

Claims 1-24 have been amended more clearly to recite applicants' invention. The specification has been revised also to conform it to standard USPTO format.

1. The title has been replaced with: "Apparatus and Method For Wireless Video and Audio Transmission Utilizing a Minute-Power Level Wave." The new title is believed to be properly descriptive of the claimed invention.

2. Claims 1 and 13 are rejected under 35 U.S.C. §102(b) over Matsuda et al. U.S. Patent 5,794,116.

The presently claimed transmission apparatus comprises a master station for transmitting video or audio by utilizing a first minute-power wave; a slave station for transmitting video or audio by utilizing a second minute-power wave; a relay station located between the master station and the slave station, the master and

slave stations located apart from each other by a distance longer than the reachable range of a first minute-power wave. This arrangement is nowhere disclosed or suggested in any of the cited references.

The Office Action alleges that Matsuda '116, Fig. 1, discloses control-data base station 19 allegedly functioning as a master/base station for transmitting video or audio to wireless video terminals 17, which are allegedly slave stations. Video server 11, network 13 and video data router 14 allegedly comprise a relay station located between the master and slave stations.

However, Matsuda '116 does not describe the signal transfer sequence recited by claim 1. In order to correspond to claim 1, the Matsuda '116 base station 19 would transmit signals first to an alleged relay station comprising video server 11, network 13 and video data router 14 (as defined by the Office Action), and such relay station would then retransmit the signal, at a new frequency, to slave stations 17. But Matsuda '116 does not say that. Instead, Matsuda '116, column 7, line 63 to column 8, line 3, describes Fig. 1 as showing a network communication between base-station-for-control-data 19 and the alleged relay station

comprising video server 11, network 13 and video data router 14 (as defined by the Office Action), not communicating by a minute-power wave, as recited by applicants' claim 1, i.e., not a network 13 connection. Matsuda '116 distinguishes between network 13 and wireless-connected terminals 17. Matsuda '116 discloses no minute-power wave between master and slave station, or those stations separated by a distance greater than the reachable range of such a minute-power wave. Accordingly, for this reason, Matsuda '116 does not disclose all of the limitations of claim 1.

Also, Matsuda '116, Fig. 1, shows the alleged relay station comprising video server 11, network 13 and video data router 14 communicating with a separate base-station-for-video-data 15 (as distinguished from base station 19) via a network connection and not via a minute-power wave, as recited by claim 1. Accordingly, for this additional reason, Matsuda '116 does not disclose all of the limitations of claim 1.

Moreover, Matsuda '116, Fig. 1, shows base-station-for-video-data 15 for transmitting video program packets to wireless video terminal 17 and a different base-station control-data 19 for transmitting separate control signals to wireless video terminal

17. Such structure cannot be said to correspond to applicants' single base-station-relay-station-slave-station arrangement without substantially changing the Matsuda '116 structure and function. Accordingly, for this additional reason, Matsuda '116 does not disclose all of the limitations of claim 1.

Thus, since minute-power waves are not transmitted between base and relay stations, the alleged relay station does not (1) transmit a demodulated portion of the first minute-power wave as a return signal, indicating successful communication between the master and relay stations, and (2) does not modulate the frequency of the first minute-power wave received from the master station to a different frequency as a second minute-power wave and transmit the second minute-power wave. No such demodulation and modulation functions of minute-power waves are described, and there is no support in the record for equivalence of such waves and modulation/demodulation functions with elements of a typical digital network such as the Matsuda '116 network 13.

For the foregoing reasons, Matsuda '116 fails to disclose all elements of applicants' claimed invention, and therefore is not a proper basis for rejection under §102. And, there is no disclosure

or teaching in Matsuda '116 that would have suggested the desirability of modifying any portions thereof effectively to anticipate or suggest applicants' presently claimed invention recited in claims 1 and 13. Accordingly, reconsideration and withdrawal of this rejection are respectfully requested.

3. Claims 2-12 and 14-24 were rejected under 35 U.S.C. §103(a) over Matsuda '116 and Oguro et al. U.S. Patent 6,282,366.

Claim 2 is directed to a transmission apparatus for using a standard television signal as the transmission signal in the forward path from the master station to the slave station, and a PCM audio signal, wherein the information indicating the address of the slave station and the reception frequency specified by the relay station are superposed on a video signal during the vertical blanking period of the video signal.

The Office Action admits that Matsuda '116 does not disclose a PCM audio signal, wherein the information indicating the address of the slave station and the reception frequency specified by the slave station are superposed on a video signal during the vertical blanking period of the video signal.

The Office Action asserts that Oguro '366 teaches a method of transmitting an alleged "control signal" by superposing it on a video signal in the vertical blanking period, during communication. However, Oguro '366 does not say that. Instead, Oguro '366, column 3, lines 25-30, describes superposing information concerning video and audio, and not superposing a control signal, in the vertical blanking period. A "control signal" is not information concerning video and audio. Further, the process occurs during a recording mode and not during a communicating mode. Accordingly, Oguro '366 does not supply what is missing from Matsuda '116.

Claim 15 recites a transmission method for performing transmission between an RF transmitter and receiver comprising (1) detecting, in advance of use, frequencies for video transmission within a reception band of the RF tuner; (2) registering the detected frequencies, as a communication frequency list, in both of the transmitter and the receiver; and (3) spreading the power spectrum by changing the frequency within the range of the communication frequency list, thereby performing spread spectrum communication. This method is nowhere disclosed or suggested in any of the cited references.

Matsuda '116 does not describe a detecting step wherein a mechanism actually performs a frequency detecting activity, in advance of use, and then a subsequent registering activity wherein those frequencies just detected are registered on a frequency list in both the transmitter and the receiver. Matsuda '116 does not describe such a "detecting" step. Instead, Matsuda '116, column 10, lines 33-47, describes base-station-for-video-data 15 selecting an unused channel from channels 22 which are available throughout zone 18. Base-station 15 then transmits to zone 18 the video menu packet 31 via the previously fixedly set channel 22 and the video data packet 32 via the channel 22 designated by the wireless video terminal 17 requesting the video data. Thus, up to this point, there is no detecting, in advance of use, of frequencies for video transmission, as recited by claim 15. Instead, Matsuda '116 merely uses a previously set channel 22 for transmitting menu 31 and uses a different channel 22 requested by terminal 17A via control signal packet 41, as described at column 9, lines 22-46, for transmitting the video data.

The Office Action cites Matsuda '116, column 10, lines 48-67, which continues the above description, which is said to describe

video terminal 17A receiving the above-described menu 31 on the preset channel 22, recognizing that it has changed from zone 18A to 18B, based on identification information identifying base-station 15 as serving zone 18B (column 11, lines 2-6), and on that basis, changing to a new frequency for receiving menu 31 (column 10, line 61-column 11, line 6). Again Matsuda '116 does not disclose any detecting, in advance of use, frequencies for video transmission, as recited by claim 15. There simply is no detecting of frequencies step. Instead, Matsuda '116, column 11, lines 1-6, describes reading the identification number of the base-station serving zone 18B, and on that basis, shifting to a new frequency for receiving menu 31. Matsuda '116 describes a pre-set frequency corresponding to each base-station identification number, and a series of steps for responding to a new number, by shifting to its associated receiving frequency. No frequency detection is involved, as recited in claim 15.

Claim 16, depending from claim 15, is allowable for the same reasons as claim 15.

Moreover, the Office Action admits that Matsuda '116 does not teach or disclose a transmission power control means for

automatically changing the transmission power during communication in accordance with the use frequency band width to keep the power density per unit band width constant. The Office Action alleges that Matsuda '116, column 10, lines 48-67, discloses a system for changing frequency within a range of a list, and proposes that the transmission power should adjust automatically during communication. However, Matsuda '116 does not say that, and there is nothing in the record that describes a structure or method for automatically adjusting the transmission power simply because the frequency has been changed. Such an event does not automatically follow, and there is no disclosure of a mechanism for causing it to happen, as recited in applicants' claims.

Oguro '366 relates to a video recording system that does not include a communication function between a transmitter and a receiver having an RF tuner. Oguro '366 does not describe detecting, in advance of use, frequencies for video transmission within a reception band of the RF tuner, and subsequently registering the detected frequencies, as a communication frequency list, in both of the transmitter and the receiver. Accordingly, Oguro '366 does not overcome the deficiencies of Matsuda '116.

For the foregoing reasons, neither Matsuda '116 nor Oguro '366 contains any teaching, suggestion, reason, motivation or incentive that would have led one of ordinary skill in the art to applicants' claimed invention. Nor is there any disclosure or teaching in either of these references which would have suggested the desirability of combining any portions thereof effectively to suggest applicants' presently claimed invention. Claim 2, which depends from claim 1, is allowable for the same reasons as claim 1. Claims 4-12, which depend from claim 3, are allowable for the same reasons as claim 13, and claim 14, which depends from claim 13, is allowable for the same reasons as claim 13. Claims 16-24 are allowable for the same reasons as for claim 15. Accordingly, reconsideration and withdrawal of this rejection are respectfully requested.

All claims 1-24 are now proper in form and patentably distinguished over all grounds of rejection cited in the Office Action. Accordingly, allowance of all claims 1-24 is respectfully requested.

Should the Examiner deem that any further action by the applicants would be desirable to place this application in even better condition for issue, the Examiner is requested to telephone applicants' undersigned representatives.

Respectfully submitted,

PARKHURST & WENDEL, L.L.P.

October 4, 2002
Date

Charles A. Wendel
Registration No. 24,453
Robert N. Wieland
Registration No. 40,225

CAW:RNW/mhs

Attachments: Specification and
Claim Mark-ups

Attorney Docket No.: HYAE:093

PARKHURST & WENDEL, L.L.P.
1421 Prince Street, Suite 210
Alexandria, Virginia 22314-2805
Telephone: (703) 739-0220

SPECIFICATION

~~TRANSMISSION APPARATUS AND TRANSMISSION METHOD~~

APPARATUS AND METHOD FOR WIRELESS VIDEO AND AUDIO TRANSMISSION UTILIZING A MINUTE-POWER LEVEL WAVE

TECHNOLOGICAL FIELD

The present invention relates to a transmission apparatus and a transmission method for transmitting video and audio between apparatuses which are connected by wireless, utilizing a wave of minute-power level.

Particularly, the present invention relates to a transmission apparatus and a transmission method, which enable transmission of information between apparatuses which are placed apart from each other by a distance longer than the reachable range of the minute-power wave.

Furthermore, the present invention relates to a transmission apparatus and a transmission method, which have the function of receiving NTSC system standard television broadcasting, reduce the influence of multi-path, enable high-definition audio transmission and highly efficient performance, and realize a communication distance longer than that in the case of using a single frequency.

Furthermore, the present invention relates to a transmission apparatus and a transmission method, which realize duplex video

power wave; and a relay station placed between the master station and the slave station which are placed apart from each other by a distance longer than the reachable range of the minute-power wave; wherein a transmission signal from the master station includes, in addition to original information such as video or audio, information indicating the address of the slave station, and information indicating a frequency at which the self-station receives a signal from the relay station; the relay station modulates the frequency of the minute-power wave received from the master station to a different frequency and outputs it; the relay station transmits information about a frequency at which the self-station receives a signal from the slave station; and when the slave station recognizes that the transmission signal is a signal directed to the self-station, it modulates the minute-power wave to the frequency specified by the relay station and transmits the video or audio, thereby establishing a transmission path between the master station and the slave station.

This invention enables transmission of video or audio by utilizing a minute-power wave, even when the distance between the master station and the slave station exceeds the reachable range of the minute-power wave.

Further, according to the invention described in ~~Claim~~ aspect 2, in the transmission apparatus described in ~~Claim~~ aspect 1, a standard television signal is used as the transmission signal in the forward path from the master station

to the slave station; and a PCM audio signal and the information indicating the address of the slave station and the reception frequency specified by the self-station are superposed on a video signal during the vertical blanking period of the video signal.

This invention enables transmission of video or audio by utilizing a minute-power wave, even when the distance between the master station and the slave station exceeds the reachable range of the minute-power wave.

Further, the invention described in ~~Claim~~ aspect 3 comprises a transmitter having an RF converter which generates a standard television signal; a receiver having an RF tuner which receives the standard television signal; available frequency detection means for detecting frequencies which can be used for video transmission, within the reception band of the RF tuner, in advance of use; detected frequency registration means for registering the detected frequencies, as a communication frequency list, in both of the transmitter and the receiver; and spread spectrum communication means for spreading the power spectrum by changing the frequency within the range of the communication frequency list, and performing spread spectrum communication.

This invention can provide a video transmission apparatus which has the function of receiving NTSC system standard television broadcasting, reduces the influence of multi-path,

enables high-definition audio transmission and highly efficient performance, realizes a longer communication distance than that in the case of using a single frequency, and is able to coexist with digital television broadcasting or mobile communication equipment which will use the same frequency band in the future.

Further, according to the invention of ~~Claim~~ aspect 4, the transmission apparatus described in ~~Claim~~ aspect 3 includes transmission power control means for automatically changing the transmission power during the communication in accordance with the use frequency band width so as to keep the power density per unit band width constant.

This invention can provide a video transmission apparatus which has the function of receiving NTSC system standard television broadcasting, reduces the influence of multi-path, enables high-definition audio transmission and highly efficient performance, realizes a longer communication distance than that in the case of using a single frequency, and is able to coexist with digital television broadcasting or mobile communication equipment which will use the same frequency band in the future.

Further, according to the invention described in ~~Claim~~ aspect 5, the transmission apparatus described in ~~Claim~~ aspects 3 or 4 includes frequency changing means for changing the frequency during the communication, in synchronization with the synchronous timing of the video signal.

This invention can provide a video transmission apparatus

which has the function of receiving NTSC system standard television broadcasting, reduces the influence of multi-path, enables high-definition audio transmission and highly efficient performance, realizes a longer communication distance than that in the case of using a single frequency, and is able to coexist with digital television broadcasting or mobile communication equipment which will use the same frequency band in the future.

Further, according to the invention described in ~~Claim~~ aspect 6, the transmission apparatus described in any of ~~Claims~~ aspects 3 to 5 includes control signal superposition and transmission means for transmitting a control signal by superposing it on the video signal in the blanking period, during the communication.

This invention can provide a video transmission apparatus which has the function of receiving NTSC system standard television broadcasting, reduces the influence of multi-path, enables highly efficient performance, realizes a longer communication distance than that in the case of using a single frequency, and is able to coexist with digital television broadcasting or mobile communication equipment which will use the same frequency band in the future.

Further, according to the invention described in ~~Claim~~ aspect 7, the transmission apparatus described in any of ~~Claims~~ aspects 3 to 6 includes audio signal superposition and transmission means for subjecting an audio signal to PCM, and

transmitting the PCM audio signal by superposing it on the video signal in the blanking period, during the communication.

This invention can provide a video transmission apparatus which has the function of receiving NTSC system standard television broadcasting, reduces the influence of multi-path, enables high-definition audio transmission, realizes a longer communication distance than that in the case of using a single frequency, and is able to coexist with digital television broadcasting or mobile communication equipment which will use the same frequency band in the future.

Further, the invention described in ~~Claim~~ aspect 8 comprises first and second transmission/reception apparatuses each comprising a transmission apparatus described in any of ~~Claims~~ aspects 3 to 7; frequency changing order control means for controlling the frequency changing order, during the communication, in such a manner that the frequency is changed in one direction, from the higher frequency to the lower frequency or from the lower frequency to the higher frequency, within the range of the communication frequency list, and when the frequency reaches the end of the frequency list, it is returned to the beginning of the frequency list; and communication control means for controlling the first and second transmission/reception apparatuses to realize duplex communication, by using a frequency time table in which the first and second transmission/reception apparatuses always use different frequencies.

This invention can provide a video transmission apparatus which realizes duplex video transmission, and reduces the influence of multi-path.

Further, according to the invention described in ~~Claim~~ aspect 9, the transmission apparatus described in ~~Claim~~ aspect 8 includes communication frequency list ~~updation~~ update means which uses the previously registered communication frequency list when ~~stating~~ starting the communication, and uses a second communication frequency list obtained by duplicating the communication frequency list after the communication has been started, and updates the second communication frequency list as desired by exchanging the result of communication, i.e., whether it is good or bad, between the first and second transmission/reception apparatuses.

This invention can provide a video transmission apparatus which realizes duplex video transmission, and solves the influence of multi-path.

Further, according to the invention described in ~~Claim~~ aspect 10, the transmission apparatus described in any of ~~Claims~~ aspects 3 to 9 includes ID storage means for storing an identification number (hereinafter referred to as an ID) which is given to the transmission apparatus during manufacture; and ID inquiry and registration means for performing mutual inquiry of IDs with another transmission apparatus which is permitted to have communication in advance of use, and registering the ID.

This invention can provide a video transmission apparatus which solves radio interference and prevents interception, in a multiple dwelling house in which the use wave areas may overlap uncertainly.

Further, according to the invention described in ~~Claim~~ aspect 11, the transmission apparatus described in ~~Claim~~ aspect 10 includes frequency setting means which always executes the reception mode in advance of the transmission mode to detect the frequency time tables of all other transmission apparatuses which are performing transmission within the same wave area, and performs transmission by using a frequency time table the use frequency of which is always different from those of these other transmission apparatuses; and retransmission means for performing retransmission by using a frequency time table different from the frequency time table when a transmission signal from another apparatus which has requested communication cannot be detected even when a predetermined period of time has passed after starting the transmission mode.

This invention can provide a video transmission apparatus which solves radio interference and prevents interception, in a multiple dwelling house in which the use wave areas may overlap uncertainly.

Further, according to the invention described in ~~Claim~~ aspect 12, the transmission apparatus described in ~~Claim~~ aspects 10 or 11 includes output stop means for stopping output of the

original information such as audio or video, when the ID which is permitted to have communication cannot be confirmed in the reception mode.

This invention can provide a video transmission apparatus which solves radio interference and prevents interception, in a multiple dwelling house in which the use wave areas may overlap uncertainly.

Further, the invention described in ~~Claim~~ aspect 13 is a transmission method for mutually transmitting video or audio between a master station and a slave station by utilizing a minute-power wave. In this method, a relay station is placed between the master station and the slave station which are placed apart from each other by a distance longer than the reachable range of the minute-power wave; a transmission signal from the master station includes, in addition to original information such as video or audio, information indicating the address of the slave station, and information indicating a frequency at which the self-station receives a signal from the relay station; the relay station modulates the frequency of the minute-power wave received from the master station to a different frequency and outputs it; the relay station transmits information about a frequency at which the self-station receives a signal from the slave station; and when the slave station recognizes that the transmission signal is a signal directed to the self-station, it modulates the minute-power wave to the frequency specified by the

relay station and transmits the video or audio, thereby establishing a transmission path between the master station and the slave station.

This invention enables transmission of video or audio by utilizing a minute-power wave, even when the distance between the master station and the slave station exceeds the reachable range of the minute-power wave.

Further, according to the invention described in ~~Claim~~ aspect 14, in the transmission method described in ~~Claim~~ aspect 13, a standard television signal is used as the transmission signal in the forward path from the master station to the slave station; and a PCM audio signal and the information indicating the destination station and the reception frequency specified by the self-station are superposed on a video signal during the vertical blanking period of the video signal.

This invention enables transmission of video or audio by utilizing a minute-power wave, even when the distance between the master station and the slave station exceeds the reachable range of the minute-power wave.

Further, the invention described in ~~Claim~~ aspect 15 is a transmission method for performing transmission between a transmitter having an RF converter which generates a standard television signal, and a receiver having an RF tuner which receives the standard television signal. In this method, in advance of use, frequencies which can be used for video

transmission are detected within the reception band of the RF tuner; the detected frequencies are registered, as a communication frequency list, in both of the transmitter and the receiver; and the power spectrum is spread by changing the frequency within the range of the communication frequency list, thereby performing spread spectrum communication.

This invention can provide a video transmission method which has the function of receiving NTSC system standard television broadcasting, reduces the influence of multi-path, enables high-definition audio transmission and highly efficient performance, realizes a longer communication distance than that in the case of using a single frequency, and is able to coexist with digital television broadcasting or mobile communication equipment which will use the same frequency band in the future.

Further, according to the invention described in ~~Claim~~ aspect 16, in the transmission method described in ~~Claim~~ aspect 15, the transmission power during the communication is automatically changed in accordance with the use frequency band width so as to keep the power density per unit band width constant.

This invention can provide a video transmission method which has the function of receiving NTSC system standard television broadcasting, reduces the influence of multi-path, enables high-definition audio transmission and highly efficient performance, realizes a longer communication distance than that in the case of

using a single frequency, and is able to coexist with digital television broadcasting or mobile communication equipment which will use the same frequency band in the future.

Further, according to the invention described in ~~Claim~~ aspect 17, in the transmission method described in ~~Claim~~ aspects 15 or 16, the frequency during the communication is changed in synchronization with the synchronous timing of the video signal.

This invention can provide a video transmission method which has the function of receiving NTSC system standard television broadcasting, reduces the influence of multi-path, enables high-definition audio transmission and highly efficient performance, realizes a longer communication distance than that in the case of using a single frequency, and is able to coexist with digital television broadcasting or mobile communication equipment which will use the same frequency band in the future.

Further, according to the invention described in ~~Claim~~ aspect 18, in the transmission method described in any of ~~Claims~~ aspects 15 to 17, during the communication, a control signal is transmitted by superposing it on the video signal in the blanking period.

This invention can provide a video transmission method which has the function of receiving NTSC system standard television broadcasting, reduces the influence of multi-path, enables highly efficient performance, realizes a longer communication distance than that in the case of using a single frequency, and is able to

coexist with digital television broadcasting or mobile communication equipment which will use the same frequency band in the future.

Further, according to the invention described in ~~Claim~~ aspect 19, in the transmission method described in any of ~~Claims~~ aspects 15 to 18, during the communication, an audio signal is subjected to PCM, and the PCM audio signal is transmitted by superposing it on the video signal in the blanking period.

This invention can provide a video transmission method which has the function of receiving NTSC system standard television broadcasting, reduces the influence of multi-path, enables high-definition audio transmission, realizes a longer communication distance than that in the case of using a single frequency, and is able to coexist with digital television broadcasting or mobile communication equipment which will use the same frequency band in the future.

Further, the invention described in ~~Claim~~ aspect 20 is a transmission method, wherein each of first and second transmission/reception apparatuses performs a transmission method described in any of ~~Claims~~ aspects 15 to 19; during the communication, the frequency changing order is controlled in such a manner that the frequency is changed in one direction, from the higher frequency to the lower frequency or from the lower frequency to the higher frequency, within the range of the communication frequency list, and when the frequency reaches the

end of the frequency list, it is returned to the beginning of the frequency list; and the first and second transmission/reception apparatuses are controlled to realize duplex communication, by using a frequency time table in which the first and second transmission/reception apparatuses always use different frequencies.

This invention provides a video transmission method which realizes duplex video communication and reduces the influence of multi-path.

Further, according to the invention described in ~~Claim~~ aspect 21, in the transmission method described in ~~Claim~~ aspect 20, the previously registered communication frequency list is used when ~~stating~~ starting the communication and, after the communication has been started, a second communication frequency list obtained by duplicating the communication frequency list is used, and the second communication frequency list is updated as desired by exchanging the result of communication, i.e., whether it is good or bad, between the first and second transmission/reception apparatuses.

This invention provides a video transmission method which realizes duplex video communication and solves the influence of multi-path.

Further, according to the invention described in ~~Claim~~ aspect 22, in the transmission method described in any of ~~Claims~~ aspects 15 to 21, an identification number (hereinafter referred

to as an ID) given to the transmission apparatus during manufacture is stored; and in advance of use, mutual inquiry of IDs is performed with another transmission apparatus which is permitted to have communication, and the ID is registered.

This invention can provide a video transmission method which solves radio interference and prevents interception, in a multiple dwelling house in which the use wave areas may overlap uncertainly.

Further, according to the invention described in ~~Claim~~ aspect 23, in the transmission method described in ~~Claim~~ aspect 22, the reception mode is always performed in advance of the transmission mode to detect the frequency time tables of all other transmission apparatuses which are performing transmission within the same wave area, and transmission is performed by using a frequency time table the use frequency of which is always different from those of these other transmission apparatuses; and when a transmission signal from another apparatus which has requested communication cannot be detected even when a predetermined period of time has passed after starting the transmission mode, retransmission is performed by using a frequency time table different from the frequency time table.

This invention can provide a video transmission method which solves radio interference and prevents interception, in a multiple dwelling house in which the use wave areas may overlap uncertainly.

Further, according to the invention described in ~~Claim~~ aspect 24, in the transmission method described in ~~Claim~~ aspects 22 or 23, when the ID which is permitted to have communication cannot be confirmed in the reception mode, the original information such as audio or video is not output.

This invention can provide a video transmission method which solves radio interference and prevents interception, in a multiple dwelling house in which the use wave areas may overlap uncertainly.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1(a) is a diagram illustrating the structure of a transmission apparatus according to a first embodiment of the present invention.

Figure 1(b) is a block diagram illustrating the respective stations of the transmission apparatus.

Figure 2 is a diagram for explaining the operation with respect to the manner of establishing a transmission path in the transmission apparatus.

Figure 3 is a diagram illustrating the waveform of a modulation signal in the transmission apparatus.

Figure 4 is a block diagram for realizing simplex communication of a video transmission apparatus according to a second embodiment of the present invention.

Figure 5 is a block diagram for realizing duplex communication of video transmission apparatuses according to

distance longer than the reachable range of a minute-power wave, thereby establishing a transmission path by the minute-power wave.

This first embodiment corresponds to the inventions which are described in ~~Claims~~ aspects 1 and 2 and ~~Claims~~ aspects 13 and 14 of this application.

Hereinafter, the first embodiment of the present invention will be described with reference to the drawings. In this first embodiment, a front-door visual phone is employed as an example. That is, in this transmission apparatus, visitor's image and speech taken by a child unit at the front door are transmitted to a parent unit in a room, and only a speech is transmitted from the parent unit, thereby performing mutual communication.

Figure 1(a) is a diagram illustrating the structure of the transmission apparatus according to the first embodiment of the present invention, and figure 1(b) is a block diagram for explaining the circuit structure of each station in the transmission apparatus.

In figure 1(a), numeral 1 denotes a master station as a child unit placed at the front door, and numeral 4 denotes a terminal connected to the master station 1, which includes a camera for taking the image of the visitor, and a mike and a speaker for a conversation with the resident in a room. Numeral 2 denotes a relay station. Since the relay station 2 is placed in a passage or the like, it is not provided with a terminal for inputting and outputting the image and the speech. Numeral 3

power wave, by performing spread frequency communication.

Hereinafter, the second embodiment of the invention will be described by using figures 4, 6, 7, 8, and 9 and table 1. This second embodiment corresponds to the inventions described in ~~Claims 3-7~~ aspects 3 to 7 and ~~Claims 15-19~~ aspects 15 to 19 of this application.

Figure 4 illustrates the structure of a transmission apparatus according to the second embodiment of the invention. Further, figure 6 illustrates the signal power according to the second embodiment of the invention. Further, figure 7 illustrates the reception level according to the second embodiment of the invention. Further, figure 8 illustrates the video transmission state according to the second embodiment of the invention in comparison with that of the conventional example. Further, figure 9 illustrates a video signal according to the second embodiment of the invention. Further, table 1 shows the frequency changing order according to the second embodiment of the invention.

Table 1

output terminal for outputting an audio signal.

Further, numeral 500 denotes an available frequency detection means described in ~~Claim~~ aspect 3. This available frequency detection means 500 detects frequencies which can be used for video transmission within the reception band of the RF tuner, in advance of use, and this means is composed of the RF tuner 118, the control circuit 123, the storage circuit 124, the comparator 126, and the detection button 133.

Further, numeral 501 denotes a frequency registration means described in ~~Claim~~ aspect 3. This frequency registration means 501 registers the detected frequencies as a communication frequency list in both of the transmission and receiving apparatuses, and this means is composed of the communication terminals 103 and 119, the control circuits 107 and 123, the storage circuits 108 and 124, and the registration button 116.

Further, numeral 502 denotes a spread spectrum communication means described in ~~Claim~~ aspect 3. This spread spectrum communication means 502 spreads the power spectrum by rapidly changing the frequency within the range of the communication frequency list, and this means is composed of the control circuits 107 and 123, the storage circuits 108 and 124, the RF converter 102, and the RF tuner 118.

Further, numeral 503 denotes a transmission power control means described in ~~Claim~~ aspect 4. This transmission power control means 503 automatically changes the transmission power

according to the use frequency band width so as to keep the power density per unit band width constant, and this means is composed of the control circuit 107, the storage circuit 108, and the variable attenuator 114.

Further, numeral 504 denotes a frequency changing means described in ~~Claim~~ aspect 5. This frequency changing means 504 changes the frequency at the synchronous timing of video signal, and this means is composed of the video input terminal 106, the comparators 110 and 126, and the control circuits 107 and 123. Further, numeral 505 denotes a control signal superposition and transmission means described in ~~Claim~~ aspect 6. This control signal superposition and transmission means 505 superposes the control signal on the video signal in the blanking period and transmits the video signal, and this means is composed of the external apparatus connecting terminals 104 and 120, the control circuits 107 and 123, the comparators 110 and 126, and the compositor 112.

Further, numeral 506 denotes an audio signal superposition and transmission means described in ~~Claim~~ aspect 7. This audio signal superposition and transmission means 506 subjects the audio signal to PCM, superposes the audio signal on the video signal in the blanking period, and transmits the video signal. This means is composed of the audio input terminal 105, the output terminal 122, the AD converter 109, the DA converter 125, the control circuits 107 and 123, the comparators 110 and 126,

the compositor 112, and the audio changing switch 127.

Here, the frequencies which are available for video transmission are the frequency bands designated by 307 in figure 6. These frequencies 307 available for video transmission have no broadcast wave 305, no external noise, and no image reception of a strong broadcast wave.

Next, the operation will be described. In figure 4, when the operator pushes the detection button 133 of the receiving apparatus 117, the control circuit 123 starts operation. The control circuit 123 controls the RF tuner 118 so that the tuner 118 receives all of the frequencies in the reception band 303.

The video output from the RF tuner 118 is input to the comparator 126 to be compared with a predetermined detection value. The result of the comparison is input to the control circuit 123. Based on the result of the comparison, the control circuit 123 detects frequencies having no video synchronous signal due to a broadcast wave or an image wave of the broadcast wave and no random signal due to external noise, as frequencies available for video transmission, and stores these frequencies as a list in the storage circuit 124.

In the case where, in advance of use, the transmission apparatus 101 and the receiving apparatus 117 are connected by a cable through the communication terminals 103 and 119 and then the operator pushes the registration button 116 of the transmission apparatus 101, the control circuit 107 of the

that in the case of using a single frequency. Further, in the future, even when digital television broadcasting or mobile communication equipment will use the same frequency band, the transmission apparatus can coexist with them and, furthermore, the transmission apparatus can be applied to a VTR movie apparatus or the like in which a camera is wireless-detachable from a recording unit body.

Further, while in this second embodiment the digitized audio signal is subjected to PCM, other compressive coding methods may be employed.

Further, while in this second embodiment the NTSC system is employed as a standard television signal, the PAS system or the SECAM system may be employed.

Embodiment 3

In this third embodiment, two pieces of transmission/ reception apparatuses, each having a transmission apparatus and a receiving apparatus according to the second embodiment, are provided.

Hereinafter, the third embodiment of the present invention will be described by using figures 5, 6, 7, 8 and 8, and table 2.

This third embodiment corresponds to the inventions described in ~~Claims~~ aspects 8 and 9 and ~~Claims~~ aspects 20 and 21 of this application.

Figure 5 shows the structure of a transmission apparatus according to the third embodiment of the invention. Figure 6

receiving a standard television signal; 220A and 220B denote voltage controlled oscillators each oscillating at a frequency according to a control signal; 221A and 221B denote mixers each compositing two inputs by multiplication; 222A and 222B denote AGC circuits each controlling the gain of the signal; 223A and 223B denote intermediate-frequency processing circuits each processing an intermediate-frequency signal; numeral 224A and 224B denote DA converters each converting a digital signal to an analog signal; 225A and 225B denote comparators each comparing an input signal with a set value; 226A and 226B denotes audio selector switches each outputting one of two kinds of audio signals; 209A and 209B denote video output terminals each outputting a video signal; and 210A and 210B denote audio output terminals each outputting an audio signal.

In figure 5, 201A and 201B denote a first transmission/reception apparatus and a second transmission/reception apparatus which are described in ~~Claim~~ aspect 8, respectively.

Further, 510 denotes a frequency changing order control means described in ~~Claim~~ aspect 8. This frequency changing order control means 510 controls the frequency changing order so that the frequency is changed in one direction from the higher frequency to the lower frequency or from the lower frequency to the higher frequency, within the range of the communication frequency list and, when reaching the end of the frequency list, the frequency is returned to the beginning of the frequency list.

This means 510 is composed of the control circuit 211A and the storage circuit 212A.

Further, 511 denotes a communication control means described in ~~Claim~~ aspect 8. This communication control means 511 controls communication so that duplex, i.e., bidirectional, communication is carried out, by using a frequency time table in which the first and second transmission/reception apparatuses always use different frequencies. This means 511 is composed of the control circuit 211A and the storage circuit 212A.

Further, 512 denotes a communication frequency list ~~updation~~ update means described in ~~Claim~~ aspect 9. This communication frequency list ~~updation~~ update means 512 uses the registered corrmunication frequency list when starting communication and, after the communication has once started, it uses a second communication frequency list which is obtained by duplicating the communication frequency list. The second communication frequency list is used for exchanging information about the result of communication, i.e., good or bad, between the two pieces of transmission/reception apparatuses. This means 512 is composed of the control circuit 211A, the storage circuit 212A, the comparators 214A and 225A, and the compositor 216A.

Each of the first and second transmission/reception apparatuses 201A and 201B is provided with the units and means constituting the transmission apparatus and the receiving

Hereinafter, the fourth embodiment of the present invention will be described by using figures 5, 6, and 7, and table 3.

This fourth embodiment corresponds to the inventions described in ~~Claims 10~12~~ aspects 10 to 12 and ~~Claims 22~24~~ aspects 22 to 24 of this application.

Figure 5 shows the structure of a transmission apparatus according to the fourth embodiment of the invention. Figure 6 shows a video signal according to the fourth embodiment of the invention. Figure 7 shows the use status in a multiple dwelling house where the areas of use waves overlap uncertainly, according to the fourth embodiment of the invention. Table 3 shows the frequency changing order and the frequency time table, according to the fourth embodiment of the invention.

Table 3

In figure 5, 520 denotes an ID storage means described in ~~Claim~~ aspect 10. This ID storage means 520 stores IDs which are

given during manufacture, and this means is composed of the communication terminals 207A and 207B, the control circuits 211A and 211B, and the storage circuits 212A and 212B.

Further, 521 denotes an ID inquiry/registration means described in ~~Claim~~ aspect 10. This ID inquiry/registration means 521 is used for mutual inquiry of IDs with another apparatus which is permitted to have communication, and registration of the ID, in advance of use. This means is composed of the detection/registration buttons 206A and 206B, the communication terminals 207A and 207B, the control circuits 211A and 211B, and the storage circuits 212A and 212B.

Further, 522 denotes a frequency setting means described in ~~Claim~~ aspect 11. This frequency setting means 522 always executes the reception mode before the transmission mode, and detects the frequency time tables of all apparatuses which are performing transmission within the same wave area, and performs transmission by using a frequency time table in which the use frequencies are always different from those of these other apparatuses. This means is composed of the RF tuners 203A and 203B, the comparators 225A and 225B, the control circuits 211A and 211B, and the storage circuits 212A and 212B.

Further, 523 denotes a retransmission means described in ~~Claim~~ aspect 11. After the transmission mode is executed, if a transmission signal from the apparatus which has requested communication cannot be detected even when a predetermined period

of time has passed, this retransmission means 523 performs transmission again by using a frequency time table different from the above-described frequency time table. This means is composed of the transmission/reception antennae 219A and 219B, the RF tuners 203A and 203B, the comparators 225A and 225B, the control circuits 211A and 211B, and the storage circuits 212A and 212B. Further, 524 denotes an output stop means described in ~~Claim~~ aspect 12. This output stop means 524 stops output of audio and video when the ID to be permitted to have communication cannot be confirmed in the reception mode. This means is composed of the control circuits 211A and 211B, the comparators 225A and 225B, the storage circuits 212A and 212B, and the audio video output circuits 227A and 227B.

In figure 5, the first and second transmission/reception apparatuses 201A and 201B have at least the same units and means as those described for the third embodiment and, furthermore, they are constructed so as to perform at least the same operations as those described for the third embodiment.

When the first and second transmission/reception apparatuses 201A and 201B are manufactured, an ID assignment apparatus is connected to the external apparatus connecting terminals 208A and 208B, and IDs which are unique to the respective apparatuses are input. When these IDs are input, the control units 211A and 211B store these IDs in the storage circuits 212A and 212B, respectively.

wave areas may overlap uncertainly, radio interference is solved and interception is prevented, and therefore, the transmission apparatus can be applied to an interior wireless terminal of a front-door visual phone or a visual telephone.

While in this fourth embodiment a digitized audio signal is subjected to PCM, other compressive coding methods may be used.

Further, while in this fourth embodiment the NTSC system is used as a standard television signal, the PAL system or the SECAM system may be used.

APPLICABILITY IN INDUSTORY

According to a transmission apparatus of ~~Claim~~ aspect 1, a relay station is provided between a master station and a slave station which transmit video or audio by utilizing a minute-power wave, a transmission signal from the master station includes information indicating the address of the slave station and a frequency at which the self-station receives a signal from the relay station, the relay station modulates the frequency of the wave received from the master station to a different frequency and outputs it, and the slave station recognizes that the transmission signal is a signal directed to the self-station and then modulates the minute-power wave to the frequency specified by the relay station, thereby establishing a transmission path between the master station and the slave station. Therefore, this apparatus enables transmission in the case where the

the reachable range of the minute-power wave.

According to a transmission apparatus of ~~Claim~~ aspect 2, in the transmission apparatus of ~~Claim~~ aspect 1, a standard television signal is used as the transmission signal in the forward path from the master station to the slave station, and a PCM audio signal and the information indicating the address of the slave station and the reception frequency specified by the self-station are superposed on a video signal during the vertical blanking period of the video signal. Therefore, this apparatus enables transmission in the case where the distance between the master station and the slave station exceeds the reachable range of the minute-power wave. Further, when the standard television signal is used as the transmission signal, the PCM audio signal and the information indicating the address of the slave station and the reception frequency specified by the self-station can be superposed ~~o~~to the transmission signal.

According to a transmission apparatus of ~~Claim~~ aspect 3, this transmission apparatus is provided with a transmitter having an RF converter which generates a standard television signal and a receiver having an RF tuner which receives the standard television signal, frequencies which can be used for video transmission are detected within the reception band of the RF tuner in advance of use, the detected frequencies are registered in both of the transmitter and the receiver, and the power spectrum is spread by changing the frequency within the range of

spectrum is spread by changing the frequency within the range of the communication frequency list to perform spread spectrum communication. Therefore, it is possible to obtain a transmission apparatus which reduces the influence of multi-path.

According to a transmission apparatus of ~~Claim~~ aspect 4, in the transmission apparatus of ~~Claim~~ aspect 3, the transmission power is automatically changed in accordance with the use frequency band width so as to keep the power density per unit band width constant. Therefore, this apparatus enables transmission at a minute-power wave level which does not interfere with reception of an existing radio communication apparatus.

According to a transmission apparatus of ~~Claim~~ aspect 5, in the transmission apparatus of ~~Claim~~ aspect 3 or 4, the frequency during the communication is changed in synchronization with the synchronous timing of the video signal. Therefore, disordering of the video signal due to the frequency change can be reduced, resulting in video transmission with improved image quality.

According to a transmission apparatus of ~~Claim~~ aspect 6, in the transmission apparatus according to any of ~~Claims~~ aspects 3 to 5, a control signal is transmitted by superposing it on the video signal in the blanking period. Therefore, it is possible to control the operation of the receiving apparatus from the transmission apparatus.

According to a transmission apparatus of ~~Claim~~ aspect 7, in

the transmission apparatus according to any of ~~Claims~~ aspects 3 to 6, an audio signal is subjected to PCM, and the PCM audio signal is transmitted by superposing it on the video signal in the blanking period. Therefore, noise in the audio signal due to the frequency change is removed, resulting in transmission with improved sound quality.

According to a transmission apparatus of ~~Claim~~ aspect 8, first and second transmission/reception apparatuses are constructed by using the transmission apparatus according to any of ~~Claims~~ aspects 3 to 8, and the frequency is changed within the communication frequency list, from the higher frequency to the lower frequency or in the reverse order, by using different frequency time tables for the first and second transmission/reception apparatuses. Therefore, mutual control is realized between the respective transmission/reception apparatuses.

According to a transmission apparatus of ~~Claim~~ aspect 9, in the transmission apparatus of ~~Claim~~ aspect 8, the previously registered communication frequency list is used when ~~stating~~ starting the communication and, after communication has been started, a second communication frequency list which is obtained by duplicating the registered communication frequency list is desirably updated according to the information as to whether the communication is good or bad. Therefore, the influence of multi-path is solved.

According to a transmission apparatus of ~~Claim~~ aspect 10, in the transmission apparatus according to any of ~~Claims~~ aspects 3 to 9, an ID which is given to the apparatus during manufacture is stored, and mutual inquiry of IDs is performed with another transmission apparatus which is permitted to have communication in advance of use, and then the ID is registered. Therefore, radio interference between the transmission apparatuses is avoided.

According to a transmission apparatus of ~~Claim~~ aspect 11, in the transmission apparatus of ~~Claim~~ aspect 10, the reception mode is executed in advance of the transmission mode to detect the frequency time tables of all other transmission apparatuses which are performing transmission within the same wave area, and transmission is performed by using a frequency time table the use frequency of which is always different from those of these other transmission apparatuses. When a transmission signal from another apparatus which has requested communication cannot be detected even when a predetermined period of time has passed after starting the transmission mode, retransmission is performed by using a frequency time table different from the frequency time table which has been used. Therefore, radio interference between the transmission apparatuses is avoided.

According to a transmission apparatus of ~~Claim~~ aspect 12, in the transmission apparatus of ~~Claim~~ aspect 10 or 11, when the ID which is permitted to have communication cannot be confirmed in

the reception mode, output of audio or video is stopped. Therefore, interception is avoided.

According to a transmission method of ~~Claim~~ aspect 13, a relay station is provided between a master station and a slave station which transmit video or audio by utilizing a minute-power wave, a transmission signal from the master station includes information indicating the address of the slave station and a frequency at which the self-station receives a signal from the relay station,

the relay station modulates the frequency of the wave received from the master station to a different frequency and outputs it, and the slave station recognizes that the transmission signal is a signal directed to the self-station and then modulates the minute-power wave to the frequency specified by the relay station, thereby establishing a transmission path between the master station and the slave station. Therefore, this method enables transmission in the case where the distance between the master station and the slave station exceeds the reachable range of the minute-power wave.

According to a transmission method of ~~Claim~~ aspect 14, in the transmission method of ~~Claim~~ aspect 13, a standard television signal is used as the transmission signal in the forward path from the master station to the slave station, and a PCM audio signal and the information indicating the address of the slave station and the reception frequency specified by the self-station

are superposed on a video signal during the vertical blanking period of the video signal. Therefore, this method enables transmission in the case where the distance between the master station and the slave station exceeds the reachable range of the minute-power wave. Further, when the standard television signal is used as the transmission signal, the PCM audio signal and the information indicating the address of the slave station and the reception frequency specified by the self-station can be superposed o the transmission signal.

According to a transmission method of ~~Claim~~ aspect 15, this method uses a transmitter having an RF converter which generates a standard television signal and a receiver having an RF tuner which receives the standard television signal, frequencies which can be used for video transmission are detected within the reception band of the RF tuner in advance of use, the detected frequencies are registered in both of the transmitter and the receiver, and the power spectrum is spread by changing the frequency within the range of the communication frequency list to perform spread spectrum communication. Therefore, it is possible to obtain a transmission method which reduces the influence of multi-path.

According to a transmission method of ~~Claim~~ aspect 16, in the transmission method of ~~Claim~~ aspect 15, the transmission power is automatically changed in accordance with the use frequency band width so as to keep the power density per unit

band width constant. Therefore, this method enables transmission at a minute-power wave level which does not interfere with reception of an existing radio communication apparatus.

According to a transmission apparatus of ~~Claim~~ aspect 17, in the transmission method of ~~Claim~~ aspect 15 or 16, the frequency during the communication is changed in synchronization with the synchronous timing of the video signal. Therefore, disordering of the video signal due to the frequency change can be reduced, resulting in video transmission with improved image quality.

According to a transmission method of ~~Claim~~ aspect 18, in the transmission method according to any of ~~Claims~~ aspects 15 to 17, a control signal is transmitted by superposing it on the video signal in the blanking period. Therefore, it is possible to control the operation of the receiving apparatus from the transmission apparatus.

According to a transmission method of ~~Claim~~ aspect 19, in the transmission method according to any of ~~Claims~~ aspects 15 to 18, an audio signal is subjected to PCM, and the PCM audio signal is transmitted by superposing it on the video signal in the blanking period. Therefore, noise in the audio signal due to the frequency change is removed, resulting in transmission with improved sound quality.

According to a transmission method of ~~Claim~~ aspect 20, first and second transmission/reception apparatuses each performing the transmission method according to any of ~~Claims~~ aspects 15 to 19

are provided, and the frequency is changed within the communication frequency list, from the higher frequency to the lower frequency or in the reverse order, by using different frequency time tables for the first and second transmission/reception apparatuses. Therefore, mutual control is realized between the respective transmission/reception apparatuses.

According to a transmission method of ~~Claim~~ aspect 21, in the transmission method of ~~Claim~~ aspect 20, the previously registered communication frequency list is used when ~~stating~~ starting the communication and, after communication has been started, a second communication frequency list which is obtained by duplicating the registered communication frequency list is desirably updated according to the information as to whether the communication is good or bad. Therefore, the influence of multi-path is solved.

According to a transmission method of ~~Claim~~ aspect 22, in the transmission method according to any of ~~Claims~~ aspects 15 to 21, an ID which is given to the apparatus during manufacture is stored, and mutual inquiry of IDs is performed with another transmission apparatus which is permitted to have communication in advance of use, and then the ID is registered. Therefore, radio interference between the transmission apparatuses is avoided.

According to a transmission method of ~~Claim~~ aspect 23, in

the transmission method of ~~Claim~~ aspect 22, the reception mode is executed in advance of the transmission mode to detect the frequency time tables of all other transmission apparatuses which are performing transmission within the same wave area, and transmission is performed by using a frequency time table the use frequency of which is always different from those of these other transmission apparatuses. When a transmission signal from another apparatus which has requested communication cannot be detected even when a predetermined period of time has passed after starting the transmission mode, retransmission is performed by using a frequency time table different from the frequency time table which has been used. Therefore, radio interference between the transmission apparatuses is avoided.

According to a transmission method of ~~Claim~~ aspect 24, in the transmission method of ~~Claim~~ aspect 22 or 23, when the ID which is permitted to have communication cannot be confirmed in the reception mode, output Of audio or video is stopped. Therefore, interception is avoided.

CLAIMS

1. (Amended) A transmission apparatus comprising:

a master station transmitting video or audio by utilizing a first minute-power wave;

a slave station transmitting video or audio by utilizing a second minute-power wave; and

a relay station ~~placed~~ located between the master station and the slave station ~~which are placed~~, said master and slave stations located apart from each other by a distance longer than the reachable range of ~~the~~ a first minute-power Wave, wherein ~~:~~

~~wherein~~ a transmission signal utilizing a first minute-power wave transmitted from the master station ~~includes~~ comprises, in addition to original ~~information such as~~ video or audio information, slave station address information ~~indicating the address of the slave station~~, and master station receiving frequency information indicating a frequency at which ~~the self-station~~ the master station receives a signal from the relay station;

said relay station is for modulating at the master station return frequency a demodulated portion of a first minute-power wave as a return signal, and for transmitting a return signal, thereby establishing a return transmission path between the relay station and the master station;

said relay station ~~modulates~~ is for modulating the frequency

of ~~the~~ a first minute-power wave received from the master station to a different frequency as a second minute-power wave and ~~outputs it~~ for transmitting a second minute-power wave;

said relay station ~~transmits~~ is for transmitting information about a relay station receiving frequency at which the ~~self-station~~ relay station receives a signal from the slave station; ~~and~~

~~when the~~ said slave station ~~recognizes~~ is for recognizing that ~~the~~ a transmission signal is a signal directed to said slave station; ~~the self-station, it modulates~~ and

said slave station is for modulating and transmitting a response signal comprising video or audio information at said relay station receiving frequency~~the minute-power wave to the frequency specified by the relay station and transmits the video or audio~~, thereby establishing a transmission path between the master station and the slave station.

2. (Amended) A transmission apparatus as described in Claim 1 wherein:

a standard television signal is used as the transmission signal in the forward path from the master station to the slave station; and

a PCM audio signal and the information indicating the address of the slave station and the reception frequency specified by the ~~self-station.~~ slave station are superposed on a video signal

during the vertical blanking period of the video signal.

3. (Amended) A transmission apparatus comprising:

a transmitter having an RF converter which generates a standard television signal;

a receiver having an RF tuner which receives the standard television signal;

available frequency detection means for detecting frequencies ~~which can be used~~ for video transmission, within the reception band of the RF tuner, in advance of use;

detected frequency registration means for registering the detected frequencies, as a communication frequency list, in both of the transmitter and the receiver; and

spread spectrum communication means for spreading the power spectrum by changing the frequency within the range of the communication frequency list, and performing spread spectrum communication.

4. (Amended) A transmission apparatus as described in Claim 3, further comprising transmission power control means for automatically changing the transmission power during the communication in accordance with the use frequency band width ~~so as to keep~~ for keeping the power density per unit band width constant.

5. (Twice Amended) A transmission apparatus as described in Claim 3, further comprising frequency changing means for changing the frequency during the communication, in synchronization with the synchronous timing of the video signal.

6. (Twice Amended) A transmission apparatus as described in Claim 3, further comprising control signal superposition and transmission means for transmitting a control signal by superposing ~~it~~ said control signal on the video signal in the blanking period, during the communication.

7. (Twice Amended) A transmission apparatus as described in Claim 3, further comprising audio signal superposition and transmission means for subjecting an audio signal to PCM, and transmitting the PCM audio signal by superposing ~~it~~ said PCM audio signal on the video signal in the blanking period, during the communication.

8. (Twice Amended) A transmission apparatus comprising:

first and second transmission/reception apparatuses each comprising a transmission apparatus described in Claim 3;

frequency changing order control means for controlling the frequency changing order, during the communication, ~~in such a manner~~ so that the frequency is changed in one direction, from ~~the~~ a higher frequency to ~~the~~ a lower frequency or from the lower

frequency to the higher frequency, within ~~the~~ a range of the communication frequency list, and when the frequency reaches ~~the~~ an end of the frequency list, ~~it~~ the frequency is returned to the beginning of the frequency list; and

communication control means for controlling the first and second transmission/reception apparatuses to realize duplex communication, by using a frequency time table in which the first and second transmission/reception apparatuses always use different frequencies.

9. (Amended) A transmission apparatus as described in Claim 8, further comprising communication frequency list ~~updation~~ update means which ~~uses~~ comprises the previously registered communication frequency list when ~~stating~~ starting the communication, and uses a second communication frequency list obtained by duplicating the registered communication frequency list after the communication has been started, and updates the second communication frequency list ~~as desired~~ by exchanging ~~the result of~~ an indication of successful/unsuccessful communication~~, i.e., whether it is good or bad,~~ between the first and second transmission/reception apparatuses.

10. (Twice Amended) A transmission apparatus as described in Claim 3, further comprising:

ID storage means for storing an identification number

(hereinafter referred to as an ID) ~~which is given to~~ stored in the transmission apparatus during manufacture; and

ID inquiry and registration means for performing mutual inquiry of IDs with another transmission apparatus which is permitted to have communication in advance of use, and registering the ID.

11. (Amended) A transmission apparatus as described in Claim 10, further comprising:

frequency setting means which always executes the reception mode in advance of the transmission mode to detect ~~the~~ frequency time tables of all other transmission apparatuses which are performing transmission within the same wave area, and performs transmission by using a frequency time table ~~the~~ a use frequency of which is always different from ~~those of these~~ the frequencies of said all other transmission apparatuses; and

retransmission means for performing retransmission by using a frequency time table different from said frequency time table when a transmission signal from another apparatus which has requested communication cannot be detected even when a predetermined period of time has passed after starting the transmission mode.

12. (Twice Amended) A transmission apparatus as described in Claim 10, further comprising output stop means for stopping

output of ~~the~~ original audio or video information ~~such as audio or video~~, when the ID which is permitted to have communication cannot be confirmed in the reception mode.

13. (Amended) A transmission method for mutually transmitting video or audio between a master station and a slave station by utilizing a minute-power wave, ~~wherein~~comprising:

locating a relay station ~~is placed~~ between the master station and the slave station which are placed apart from each other by a distance longer than the reachable range of the minute-power ~~Wave~~wave;

generating a transmission signal from the master station ~~includes~~comprising, in addition to original audio or video information ~~such as video or audio~~, information indicating ~~the~~an address of the slave station, and information indicating a frequency at which the ~~self-station~~ master station receives a signal from the relay station;

modulating by said relay station ~~modulates~~ the frequency of the minute-power wave received from the master station to a different frequency and ~~outputs it~~outputting said different frequency;

transmitting by said relay station ~~transmits~~ information about a frequency at which the ~~self-station~~ relay station receives a signal from the slave station;

and

~~when the slave station recognizes that the transmission signal is a signal directed to the self-station, it modulates~~ modulating by the slave station the minute-power wave to the frequency specified by the relay station and ~~transmits~~ transmitting the video or audio, thereby establishing a transmission path between the master station and the slave station, when the slave station recognizes that the transmission signal is a signal directed to the slave station.

14. (Amended) A transmission method as described in Claim 13, wherein:

using a standard television signal ~~is used~~ as the transmission signal in the forward path from the master station to the slave station; and

superposing a PCM audio signal and the information indicating the destination station and the reception frequency specified by the ~~self-station are superposed~~ slave station on a video signal during the vertical blanking period of the video signal.

15. (Amended) A transmission method for performing transmission between a transmitter having an RF converter which generates a standard television signal, and a receiver having an RF tuner which receives the standard television signal, ~~wherein~~comprising:

detecting, in advance of use, frequencies ~~which can be used~~ for video transmission ~~are detected~~ within ~~the~~ a reception band

of the RF tuner;

registering the detected frequencies ~~are registered~~, as a communication frequency list, in both of the transmitter and the receiver; and

spreading the power spectrum ~~is spread~~ by changing the frequency within the range of the communication frequency list, thereby performing spread spectrum communication.

16. (Amended) A transmission method as described in Claim 15, ~~wherein~~ further comprising automatically changing the transmission power during the communication ~~is automatically changed~~ in accordance with the use frequency band width so as to keep the power density per unit band width constant.

17. (Twice Amended) A transmission method as described in Claim 15, ~~wherein~~ comprising changing the frequency during the communication ~~is changed~~ in synchronization with the synchronous timing of the video signal.

18. (Twice Amended) A transmission method as described in Claim 15, ~~wherein, during the communication,~~ transmitting a control signal ~~is transmitted~~ during the communication by superposing ~~it~~ the control signal on the video signal in the blanking period.

19. (Twice Amended) A transmission method as described in Claim

15, further comprising ~~wherein~~, during the communication, subjecting an audio signal ~~is subjected~~ to PCM, and transmitting the PCM audio signal ~~is transmitted~~ by superposing ~~it~~ the PCM audio signal on the video signal in the blanking period.

20. (Twice Amended) A transmission method, ~~wherein~~comprising:

performing by each of first and second transmission/reception apparatuses performs a transmission method described in Claim 15;

~~during the communication,~~ controlling the frequency changing order ~~is controlled~~ during the communication so ~~in such a manner~~ that the frequency is changed in one direction, from ~~the~~ a higher frequency to ~~the~~ a lower frequency or from the lower frequency to the higher frequency, within ~~the~~ a range of the communication frequency list, and when the frequency reaches ~~the~~ an end of the frequency list, ~~it~~ the frequency is returned to the beginning of the frequency list; and

controlling the first and second transmission/reception apparatuses ~~are controlled~~ to realize duplex communication, by using a frequency time table in which the first and second transmission/reception apparatuses always use different frequencies.

21. (Amended) A transmission method as described in Claim 20, ~~wherein~~ further comprising:

using the previously registered communication frequency list

~~is used~~ when ~~stating~~ starting the communication and, after the communication has been started, using a second communication frequency list obtained by duplicating the communication frequency list ~~is used~~, and

updating the second communication frequency list ~~is updated as desired~~ by exchanging ~~the result of~~ an indicationg of successful/unsuccessful communication~~, i.e., whether it is good or bad,~~ between the first and second transmission/reception apparatuses.

22. (Twice Amended) A transmission method as described in Claim 15, ~~wherein~~comprising:

storing an identification number (hereinafter referred to as an ID) ~~given to~~ in the transmission apparatus during manufacture ~~is stored~~; and

in advance of use, performing mutual inquiry of IDs ~~is performed~~ with another transmission apparatus which is permitted to have communication, and the ID is registered.

23. (Amended) A transmission method as described in Claim 22, ~~wherein~~comprising:

always performing the reception mode ~~is always performed~~ in advance of the transmission mode to detect ~~the~~ frequency time tables of all other transmission apparatuses which are performing transmission within ~~the~~ a same wave area, and performing

transmission ~~is performed~~ by using a frequency time table ~~the~~ a use frequency of which is always different from those of these other transmission apparatuses; and

performing retransmission by using a frequency time table different from said frequency time table when a transmission signal from another apparatus which has requested communication cannot be detected even when a predetermined period of time has passed after starting the transmission mode~~, retransmission is performed by using a frequency time table different from said frequency time table~~.

24. (Twice Amended) A transmission method as described in Claim 22, ~~wherein,~~ comprising:

not outputting the original audio or video information when the ID which is permitted to have communication cannot be confirmed in the reception mode~~, the original information such as audio or video is not output~~.